

Brooks, Laura

From: Castaneda, Norma
Sent: Thursday, August 04, 2005 10:23 AM
To: Rampe, John; Shelton, Dave; Aguilar, Mark; Carl Spreng; David Kruchek
Cc: Brooks, Laura; Walstrom, Jan; Sattelberg, Mark
Subject: RE: FW: FW: Draft response to comments on thePhysicalCharacteristics SR

Mark Aguilar and Dave Kruchek:

Mark Aguilar, Dave Kruchek, and John Rampe have agreed to the re-revised Response to Comments. This comment response will replace the original response in the Draft Response to Comments. Therefore, Can we consider the "Site Physical Characteristics Summary Report" and Response to Comments approved for purposes of going forth in developing the Draft RI/FS Report? Once approved, the complete Response to Comments will be placed in the Administrative Record. Responses will then be incorporated into Section 2 of the Draft RI/FS Report, as appropriate. An email approval is fine.

Thanks, Norma

-----Original Message-----

From: Brooks, Laura
Sent: Tuesday, August 02, 2005 12:33 PM
To: Rampe, John; Surovchak, Scott; Schassburger, Richard; Castaneda, Norma; Walstrom, Jan; Wiernelt, Karen; Shelton, Dave; Davis, Robert W.
Subject: FW: FW: FW: Draft response to comments on thePhysicalCharacteristics SR

> -----Original Message-----

> **From:** David Kruchek
> **Sent:** Tuesday, August 02, 2005 12:22 PM
> **To:** Brooks, Laura
> **Subject:** Re: FW: FW: Draft response to comments on thePhysicalCharacteristics SR

> Thanks Laura, this looks fine.

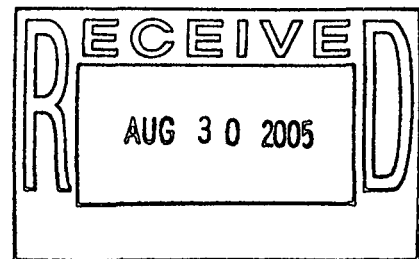
> >>> "Brooks, Laura" <Laura.Brooks@rfets.gov> 08/01/05 09:49AM >>>

> > A re-revised response to comment:

> > Figure 2, RFETS Surface Features after Accelerated Actions, will be revised for the final draft RI/FS Report to reflect the remaining surface features after accelerated actions are complete. This will include the functional channel configuration. A new Figure 3 will be created displaying overland flow directions and delineating functional channel watersheds.

> > The functional channel configurations, interceptor ditches, and vegetative cover were not required for an accelerated action, and they are not part of the final remedy; however, the following text will be modified/added to Section 2.0, Surface Features:

> > Site accelerated remedial actions resulted in removal of all buildings, except for the former east and west vehicle inspection sheds.
> All surface pavement has been removed. For a discussion of remaining subsurface foundational elements, see Section 3.0, Subsurface Features.
> Other site activities resulted in some surface recontouring and revegetation of the former IA, after removal of parking lots and other surface infrastructure features, as necessary, to provide a stable land
> surface consistent with the end use of RFETS as a wildlife refuge.



ADMIN RECORD

>>>

- >> The management of site stormwater at the completion of all
- > accelerated actions, including building demolitions, was to allow
- > surface water to flow as sheet flow following the existing contours of
- > the site. An overall goal was to disturb as little of the existing
- > surface as possible while maintaining the sheet flow concept. A
- design
- > criterion for the site drainage was to maintain soil and slope
- stability
- > by minimizing erosion. Revegetation and erosion mats and/or
- > hydromulching were utilized to control erosion in areas of disturbed
- > soil and sloping surfaces.
- >>
- >> The functional channels were configured to also minimize soil
- > disturbance and were generally placed in areas of existing major
- surface
- > water drainage features. Erosion was controlled in the functional
- > channels by armoring the entire length of the channel with rip-rap or
- > erosion matting and revegetation. Each of the five functional
- channels
- > was designed to convey the 100-year storm event as follows:
- >>
- >> • Functional Channel (FC)-1: FC-1 drains the northwestern corner
- > of the site by a combination of an existing vegetated channel and a
- new
- > channel through the soil borrow area directly west of the former
- > Building 371 area. The upstream portion of FC-1 was an existing
- surface
- > water feature. FC-1 is approximately 2000 feet long and drains an
- area
- > of 48 acres with a peak flow of 76 cfs.
- >> * FC-2: FC-2 drains an area between and south of the former
- > Buildings 371 and 771 areas by a combination of an existing vegetated
- > channel and a new channel upstream of the existing channel. Much of
- > FC-2 was an existing surface water drainage feature and located in the
- > flowline of large diameter culverts that were removed. A wetland area
- > was constructed downstream of the existing channel before FC-2 flows
- > into FC-3. FC-2 is approximately 1800 feet long and drains an area of
- > 51 acres with a peak flow of 72 cfs.
- >> * FC-3: FC-3 drains the northern side of the site and receives
- > flow from FC-2. FC-3 is located at an existing surface water feature
- > and in the flowline of large diameter culverts that were removed.
- FC-3
- > is approximately 1200 feet long and drains an area of 197 acres with a
- > peak flow of 264 cfs.
- >> • FC-4: FC-4 drains the middle and southern portion of the site.
- >
- > FC-4 is located at an existing surface water feature and in the
- flowline
- > of several large diameter culverts that were removed. A wetland was
- > constructed in FC-4 in an existing flat area of the channel. FC-4 is
- > approximately 3300 feet long and drains an area of 242 acres with a
- peak
- > flow of 277 cfs.
- >> * > FC-5: FC-5 drains the southeastern corner of the site and
- > conveys water into FC-4. FC-5 is the combination of an existing
- > vegetated channel and a new channel. A portion of FC-5 is an existing
- > surface water feature. The new portion of the functional channel
- > generally follows the flowli> ne of a large diameter culvert that was
- > removed. FC-5 is approximately 1400 feet long and drains an area of
- 24
- > acres with a peak flow of 37 cfs.
- >>
- >> This work was completed as part of a series of best management
- > practices and was generally guided by the Land Configuration drawings
- > (K-H 2004a) and the Environmental Assessment, Pond and Land
- > Configuration DOE/EA-1492 (DOE 2004). RFETS surface features,
- including
- > the location of the functional channels are displayed on Figure 2.
- > Overland flow directions and functional channel watershed delineations
- >> are displayed on Figure 3.

>>
>> Please let me know what you think. LMB
>> -----Original Message-----
>> From: David Kruchek [SMTP:dakruche@smtpgate.dphe.state.co.us]
>
>> Sent: Tuesday, July 19, 2005 11:20 AM
>> To: Rampe, John; Brooks, Laura
>> Cc: Aguilar.Mark@epamail.epa.gov; Kimmel.Larry@epamail.epa.gov;
>> Sattelberg, Mark; Castaneda, Norma; Surovchak, Scott; Shelton, Dave;
>> Walstrom, Jan; Wiemelt, Karen; EDGAR Ethington; HARLEN Ainscough;
>> Spreng, Carl; Steve Gunderson
>> Subject: RE: FW: Draft response to comments on the
>> PhysicalCharacteristics SR
>>
>> Sorry for the delay in responding to the proposed modification to
>> include discussion of the functional channels. We do have the
>> following
>> comments:
>>
>> 1) We would appreciate a bit more discussion regarding the rationale
>> for these channels, as well as the final land configuration. This
>> should identify the reason for their placement and extent, the area
>> intended to be drained, control of overland flow (amount and
>> direction)
>> and runoff/erosion, and reduction of overland flow as well as GW
>> through
>> remaining contaminated structures and areas. We do not expect an
>> extended discussion of the rationale in this section if this will be
>> covered in future sections to be provided. Another couple of
>> sentences
>> or paragraph should suffice to provide the additional information we
>> are
>> requesting as long as this will be fully developed in later
>> sections.
>>
>> 2) Also we would like to have the discussion, as provided, modified
>> to
>> recognize that although the above surface structures/buildings have
>> been
>> removed, some slabs and below grade building structures remain and
>> some
>> of those are contaminated. As it is now, the statement that all
>> buildings and pavement have been removed appears to be misleading
>> and
>> not completely correct, since parts of some buildings remain.
>>
>> >>> "Rampe, John" <John.Rampe@rf.doe.gov> 07/18/05 09:57AM >>>
>> Laura:
>>
>> I don't think I got back to you on this yet, but this response looks
>> OK
>> to me.
>>
>> Thanks.
>>
>> JR
>>
>> -----Original Message-----
>> From: Brooks, Laura
>> Sent: Wednesday, July 13, 2005 10:28 AM
>> To: Kimmel.Larry@epamail.epa.gov
>> Cc: Aguilar.Mark@epamail.epa.gov; Rampe, John; Steve Gunderson;
>> Wiemelt,
>> Karen; Castaneda, Norma; Sattelberg, Mark; Surovchak, Scott;
>> Shelton,
>> Dave; Spreng, Carl; Walstrom, Jan
>> Subject: RE: FW: Draft response to comments on the Physical
>> Characteristics SR
>>
>> Based on subsequent discussions, I am proposing the following change
>> to

> > the response to comments:

> >

> > Revised Response:

> > Figure 2, RFETS Surface Features after Accelerated Actions, will be>

> > revised for the final draft RI/FS Report to reflect the remaining

> > surface features after accelerated actions are complete. This will

> > include the functional channel configuration. A new Figure 3 will be

> > created displaying overland flow directions.

> >

> > The functional channel configurations, interceptor ditches, and

> > vegetative cover were not required for an accelerated action, and

> > they

> > are not part of the final remedy; however, the following text will

> > be

> > modified/added to Section 2.0, Surface Features:

> >

> > Site accelerated remedial actions resulted in removal of all

> > buildings,

> > except for the former east and west vehicle inspection sheds. All

> > pavement has been removed. Other site activities resulted in some>

> > surface recontouring and revegetation of the former IA, after

> > removal

> > of

> > parking lots and other surface infrastructure features, as

> > necessary,

> > to

> > provide a stable land surface consistent with the end use of RFETS

> > as

> > a

> > wildlife refuge. In addition, ditches, stormwater conveyances,

> > functional channels and selected ponds have been eliminated or

> > reconfigured as part of a series of best management practices

> > implemented to minimize erosion, meet objectives for slope stability

> > and

> > manage overland stormwater flow. The functional channels were

> > designed

> > for a 100-year event. This work was generally guided by the Land

> > Configuration drawings (K-H 2004a) and the Environmental Assessment,

> > Pond and Land Configuration DOE/EA-1492 (DOE 2004). RFETS surface

> > features, including the location of the functional channels are

> > displayed on Figure 2. Overland flow directions are displayed on

> > Figure

> > 3.

> >

> > Is this ok? LMB

> >

> >

> >

> > -----Original Message-----

> > From: Kimmel.Larry@epamail.epa.gov

> > [SMTP:Kimmel.Larry@epamail.epa.gov]

> > Sent: Tuesday, June 07, 2005 10:08 AM

> > To: Brooks, Laura

> > Cc: Aguilar.Mark@epamail.epa.gov; Rampe, John; Steve

> > Gunderson;

> > Wiemelt, Karen; Elizabeth Pottorff; Castaneda, Norma; Sattelberg,

> > Mark;

> > Surovchak, Scott; Shelton, Dave; Ross.Lorraine@epamail.epa.gov

> > Subject: Re: FW: Draft response to comments on the Physical

> > Characteristics SR

> >

> > Hi Laura,

> >

> > We have reviewed the responses to comments on the Site

> > Characteristics

> > report and concur with the responses with a minor exception to the

> > General comment. That comment requests information to be provided

> > in

> > the

> > document regarding final site configuration, including functional

*> > > -----Original Message-----
> > > From: Brooks, Laura
> > > Sent: Monday, May 23, 2005 3:20 PM
> > > To: Steve Gunderson; 'aguilar.mark@epamail.epa.gov';
> > Legare,
> > Joe; Shelton, Dave; Walstrom, Jan; Surovchak, Scott; Schassburger,
> > Richard; Sattelberg, Mark; Rampe, John
> > > Subject: Draft response to comments on the Physical
> > Characteristics SR
> > >
> > > > <<051805Physical Characteristics Response to Comments.doc>>
> > > Attached is the Draft Response to Comments on the Physical
> > > Characteristics Summary Report. Please review and let us know if
> you
> > have any comments. Once the response to comments are approved, I
> > will
> > incorporate the changes, turn the summary report into RI, Section
> 2,
> > Physical Characteristics of the Study Area, and place section 2 on
> > the
> > DOE website. LMB
> > > (See attached file: 051805Physical Characteristics Response to>
> > Comments.doc) << File: 051805Physical Characteristics Response to
> > Comments.doc >>

Comment Response

**3/17/05 EPA Comments, 3/17/05 FWS Comments and 3/25/05 CDPHE Comments on
2/16/05 Draft Site Physical Characteristics Summary Report**

No.	Comment From	Comment	Response
General Comment	EPA	Due to the timing of this document's release, the site-wide drainage plan had not been finalized. In the revised version, please provide a discussion of the drainage plan consisting of functional channel configurations, interceptor ditches, and vegetative cover designed for diverting and capturing runoff. The document should also include a figure displaying final drainage configurations and overland flow directions.	<p>Figure 2, RFETS Surface Features after Accelerated Actions, will be revised for the final draft RI/FS Report to reflect the remaining surface features after accelerated actions are complete. This will include the functional channel configuration. A new Figure 3 will be created displaying overland flow directions and delineating functional channel watersheds.</p> <p>The functional channel configurations, interceptor ditches, and vegetative cover were not required for an accelerated action, and they are not part of the final remedy; however, the following text will be modified/added to Section 2.0, Surface Features:</p> <p>Site accelerated remedial actions resulted in removal of all buildings, except for the former east and west vehicle inspection sheds. All surface pavement has been removed. For a discussion of remaining subsurface foundational elements, see Section 3.0, Subsurface Features. Other site activities resulted in some surface recontouring and revegetation of the former IA, after removal of parking lots and other surface infrastructure features, as necessary, to provide a stable land surface consistent with the end use of RFETS as a wildlife refuge.</p>

ADMIN RECORD

No.	Comment From	Comment	Response
			<p>The management of site stormwater at the completion of all accelerated actions, including building demolitions, was to allow surface water to flow as sheet flow following the existing contours of the site. An overall goal was to disturb as little of the existing surface as possible while maintaining the sheet flow concept. A design criterion for the site drainage was to maintain soil and slope stability by minimizing erosion. Revegetation and erosion mats and/or hydromulching were utilized to control erosion in areas of disturbed soil and sloping surfaces.</p> <p>The functional channels were configured to also minimize soil disturbance and were generally placed in areas of existing major surface water drainage features. Erosion was controlled in the functional channels by armoring the entire length of the channel with rip-rap or erosion matting and revegetation. Each of the five functional channels was designed to convey the 100-year storm event as follows:</p> <ul style="list-style-type: none"> Functional Channel (FC)-1: FC-1 drains the northwestern corner of the site by a combination of an existing vegetated channel and a new channel through the soil borrow area directly west of the former Building 371 area. The upstream portion of FC-1 was an existing surface water feature. FC-1 is approximately 2000 feet long and drains an area of 48 acres with a peak flow of 76 cfs.

No.	Comment From	Comment	Response
			<ul style="list-style-type: none"> FC-2: FC-2 drains an area between and south of the former Buildings 371 and 771 areas by a combination of an existing vegetated channel and a new channel upstream of the existing channel. Much of FC-2 was an existing surface water drainage feature and located in the flowline of large diameter culverts that were removed. A wetland area was constructed downstream of the existing channel before FC-2 flows into FC-3. FC-2 is approximately 1800 feet long and drains an area of 51 acres with a peak flow of 72 cfs. FC-3: FC-3 drains the northern side of the site and receives flow from FC-2. FC-3 is located at an existing surface water feature and in the flowline of large diameter culverts that were removed. FC-3 is approximately 1200 feet long and drains an area of 197 acres with a peak flow of 264 cfs. FC-4: FC-4 drains the middle and southern portion of the site. FC-4 is located at an existing surface water feature and in the flowline of several large diameter culverts that were removed. A wetland was constructed in FC-4 in an existing flat area of the channel. FC-4 is approximately 3300 feet long and drains an area of 242 acres with a peak flow of 277 cfs. FC-5: FC-5 drains the southeastern corner of the site and conveys water into FC-4. FC-5 is the combination of an existing vegetated channel and a new

No.	Comment From	Comment	Response
			<p>channel. A portion of FC-5 is an existing surface water feature. The new portion of the functional channel generally follows the flowline of a large diameter culvert that was removed. FC-5 is approximately 1400 feet long and drains an area of 24 acres with a peak flow of 37 cfs.</p> <p>This work was completed as part of a series of best management practices and was generally guided by the Land Configuration drawings (K-H 2004a) and the Environmental Assessment, Pond and Land Configuration DOE/EA-1492 (DOE 2004). RFETS surface features, including the location of the functional channels are displayed on Figure 2. Overland flow directions and functional channel watershed delineations are displayed on Figure 3.</p>
1	EPA	<p>Page 11, Section 4.5, Seismic Conditions. Given that limited seismic data is available in the state, the sentence concluding that the site is in a zone of relatively low seismic activity should be qualified.</p>	<p>The following sentence will be modified in section 4.5 as follows: Consequently, based on current available information, the site is in a zone of relatively low seismic activity.</p>
2	EPA	<p>Page 13, Section 5.0, Surface Water Hydrology. To clarify the surface water hydrology section, additional discussion describing the regional watershed, including an overview of all water supply ditches within the Rocky Flats drainage system, would be beneficial. As an example, this discussion would be improved with a description similar to the Technical Memorandum, Final Work Plan, Operable Unit No. 7, Volume 1, Section 2.6.1 (EG&G, 1994). Also, please define the stream classifications for the various water bodies discussed throughout the text (e.g., page 14, Rock Creek stream segment 8) and displayed in Figure 11.</p>	<p>The descriptions for segment 4a, 4b and 5 are included in the text in sections 5.2 and 5.3. A sentence will be added to section 5.4 as follows: South Woman Creek, including Smart Ditch, is designated as stream segment 6 in the Big Dry Creek basin by the Colorado WQCC. An additional note will be added to Figure 11, Colorado WQCC Stream Segment Classifications (Big Dry Creek basin), as follows: South Woman Creek, including Smart Ditch, is designated as segment 6 of the Big Dry Creek basin.</p>

No.	Comment From	Comment	Response
3	EPA	Page 14, Section 5.1, Rock Creek. Please provide a more detailed description of the creek similar to the sections describing the Walnut Creek and Woman Creek drainages.	Section 5.1. The first sentence in the first full paragraph on page 15 will be deleted and replaced with the following text: The Rock Creek drainage basin consists of an alluvial terrace that slopes gently to the northeast and is dissected by Rock Creek and its tributaries, which flow generally from southwest to northeast. The principal surface features in the RC drainage include (from north to south) Short Ear Branch, Plum Branch, Mahonia Branch, Snowberry Branch, and Lobelia Branch (Figure 10). Two ponds are visible along the main stem of Rock Creek. The westernmost of the two ponds, located at the southern end of the RC drainage, is designated Lindsay 2. The other is Lindsay 1. The ponds predate federal ownership of the site.
4	EPA	Page 15, Section 5.1, Rock Creek. Although the document describes the creek as ephemeral, it should be noted that portions of Rock Creek are perennial.	The sentence will be revised as follows: Flow in Rock Creek is ephemeral; however, portions of Rock Creek are perennial.
5	EPA	Page 17, Section 5.2.2, No Name Gulch. Please provide a more specific description of the diversion ditches around the landfill and the location of discharges from the diversion ditches into No Name Gulch.	The second paragraph in section 5.2.2 will be modified as follows: No Name Gulch is ephemeral, with periodic runoff occurring most frequently in the spring. The closure of the former Present Landfill, with a RCRA-compliant cover constructed over the landfill area, is expected to generate additional runoff compared to the historic runoff pattern. Drainage ditches along the perimeter of the Present Landfill cover allow free drainage of the geosynthetic composite cover and drainage layer, and direct surface water away from the landfill into No Name Gulch east of the East Landfill Pond Dam. These ditches are generally lined with vegetation, or riprap in

No.	Comment From	Comment	Response
			<p>areas with steeper slopes that are more prone to erosion. The perimeter channels are vegetated earthen channels; steeper sloped sections are rip-rapped. The discharges of these perimeter channels are in the same location as the historical perimeter channels (east of the East Landfill Pond Dam and north and south of the East Landfill Pond. Small amounts of additional water will flow from the perimeter channels due to the impermeable cover of the landfill.</p>
6	EPA	<p>Page 22, Section 5.3, Woman Creek. The description of Woman Creek would be improved by listing tributaries and diversions to the watershed in the opening paragraph comparable to the Walnut Creek discussion (Section 5.2). It is recommended that the description provided in the April 1996 Final Phase I RFI/RI Report, Woman Creek Priority Drainage, Operable Unit 5, Volume 1, Section 3.5 be used as guide to improving readability of this section.</p>	<p>The opening paragraph of Section 5.3 will be revised as follows: The Woman Creek drainage traverses comprises the southern side of the site, and receives captures runoff from the southern portion of the IA OU, as well as the majority of the southern BZ OU (Figure 10). The area of the on-site portion of the Woman Creek watershed upstream from gaging station GS01 is approximately 1602 acres. (It is noted that a Smart Ditch splitter box can be overtopped in a large storm, essentially adding an additional 792 acres of the Smart Ditch watershed, located to the south of the Woman Creek watershed.) 3.1 square miles. Several tributaries to Woman Creek exist within the RFETS boundaries, and include, from north to south: the South Interceptor Ditch (SID), North Woman Creek, Owl Branch, and Antelope Springs Gulch. While flows in the SID are anticipated to be reduced following completion of all accelerated actions, the hydrology in the Woman Creek tributaries is expected to remain unchanged between the historic and future configuration of RFETS. Descriptions of these</p>

No.	Comment From	Comment	Response
			tributaries, the main channel of Woman Creek, and the off-site flow of Woman Creek, are provided in Sections 5.3.1 through 5.3.6.
7	EPA	Page 41, Section 8.6, Future RFETS Land Use, Footnote 8. The website (www.rockyflats.fws.gov) identified in the footnote is not accessible.	The website address in footnote 8 will be corrected to http://rockyflats.fws.gov .
8	EPA	Page 57, Section 9.2.5, Wildlife Species of Special Concern. Please also mention the special status of the black-tailed prairie dog.	No change made. The black-tailed prairie dog is discussed in section 9.2.1.1.
9	EPA	Page 58, Section 9.2.7, Potential Effects of Contamination on Wildlife and Vegetation. This section provides information on studies conducted at the site and potential impacts to the resources at the site. The information appears to be somewhat out of context since it is not related to a description of ecology. It is recommended that this information be moved to a more appropriate section of the RI.	This concept needs to be introduced in the beginning of the final draft RI/FS Report. Further details will be discussed in the ERA. The remaining sections of the RI Report will discuss the nature and extent of contamination, fate and transport of contamination and the results of the CRA. Since this section provides the most specific discussion on ecology in the RI, this is the best location to introduce such studies previously conducted at the site.
10	EPA	Figure 3, Easement Location Map. Figure 3 identifies all easements located at Rocky Flats. The map identifies 39 easements in the right margin, but not all 39 are identified on the map. If not all easements are going to be identified on the map, please add a note on the map to that affect.	Figure 3, Easement Location Map, will be revised to include all easements identified in the easement description key.
11	EPA	Figure 11, CWCCC Stream Classification Segments. For consistency, please label all segmented water bodies.	An additional note will be added to Figure 11, Colorado WQCC Stream Segment Classifications (Big Dry Creek basin), as follows: South Woman Creek, including Smart Ditch, is designated as segment 6 of the Big Dry Creek basin. Segment 8 of the Boulder Creek basin and segment 6 of the Big Dry Creek basin will not be labeled on the figure. The figure will focus on the surface water stream segments that have the potential to be impacted by DOE activities.
1	FWS	Page 2, section 2.0, first paragraph – The description sounds like RFETS extends up to Highway 93 on the west. Add a description of Charlie McKay's land.	The sentence will be revised as follows: To the east is Jefferson County Highway 17, also known as Indiana Street; to the south are agricultural and industrial properties and State

No.	Comment From	Comment	Response
			Highway 72; and to the west is State Highway 93, approximately one-quarter mile from the RFETS western boundary. No description of Charlie McKay's land will be added to the text since it is outside the study area.
2	FWS	Page 3, section 2.0, third paragraph – There have been some changes since the Pond and Land Configuration EA that should be discussed.	Please see response to the EPA general comment.
3	FWS	Page 4, section 2.0, first paragraph – Define what is meant by “reasonable effort”.	The last sentence of the first paragraph will be deleted and replaced with the following sentence from the Final IM/IRA for IHSS 114 and RCRA Closure of the Present Landfill: Additionally, surface vegetation will be established on this soil layer to enhance resistance to surface erosion, prevent intrusion of noxious weeds and burrowing animals, and to provide an aesthetic appearance to the cover, using appropriate native seed mixes.
4	FWS	Page 4, section 2.0, third paragraph – The Refuge Act does not only provide for an easement for the Indiana Avenue improvements. It provides for right-of-way, which can include easement, purchase, trade, etc.	The last two sentences in the paragraph will be revised as follows: The Refuge Act provides that a future easement is authorized land may be made available for possible widening of transportation improvements along Indiana Street along the eastern RFETS boundary. Otherwise new easements All other land transfers are prohibited by the Refuge Act.
5	FWS	Page 14, section 5.0, last paragraph – Throughout the report referenced section numbers need to be review to make sure they are complete and correct.	The entire draft RI/FS Report will undergo a technical edit after it is compiled to verify section numbers.
6	FWS	Page 40, section 8.6, last purposes bullet – This bullet should be removed since it is not a purpose. It is a consideration in managing the Refuge.	The following bullet will be deleted: Providing the public with opportunities for compatible outdoor recreational and educational activities.
7	FWS	Figure 24, Potential Prairie Dog Habitat – The map does not show the potential habitat, but rather the existing towns. The potential habitat would cover most of the eastern portion of the site.	The title for Figure 24 will be revised to “Prairie Dog Colonies in 2002”.
General	CDPHE	Overall, a good general description of the site, some portions are out of date,	Section 2, Physical Characteristics of the Study

No.	Comment From	Comment	Response
Comment		but easily corrected once the land and pond configuration decisions are made.	Area, of the final draft RI/FS Report will be revised to reflect the site physical characteristics after the completion of the accelerated actions.
1	CDPHE	Section 1.0, page 1: 3rd paragraph - Why not also include a recognition of the area being retained by DOE? Not all of RFETS will be transferred to FWS, specifically the IA and area to the east is to be retained by DOE.	It is inappropriate in Section 2, Physical Characteristics of the Study Area, of the final draft RI/FS Report to speculate on which areas of the site will be retained by DOE. DOE will determine which areas of the site DOE will maintain after the completion of the RI/FS.
2	CDPHE	Section 3, page 4: Need to also include the remaining fence posts, utility poles, and other similar infrastructure that remain within 3 ft of the surface, as well as the deeper remaining infrastructure such as the various slabs (some contaminated), tunnels, sewer lines, water lines, foundation drains, storm drains, manholes/manways, Valve Vaults, Process Waste Lines, etc, below 3 feet.	<p>Table 1, Man-made Structures That Remain Below Grade Level, and Figure 4, Subsurface Features After Accelerated Actions, are under development.</p> <p>Please note that this information is a reasonably representative depiction of known important structures and infrastructure components and is not intended as a definitive or all-inclusive mapping of everything that might be encountered in the subsurface. There are likely to be many items left in the subsurface over the more than 50 year history of RFETS that cannot be mapped because the locations are not known. We will provide this “disclaimer” to avoid unintended misinterpretation, and clarify that the following items remain.</p> <p>Infrastructure below 3 feet, including slabs, building foundations, tunnels, sewer lines, water lines, foundation drains, storm drains, manholes/manways, valve vaults and process waste lines, will be listed in Table 1 and shown on Figure 4 (or multiple figures, if necessary). The table will identify if the remaining infrastructure has fixed contamination.</p>

No.	Comment From	Comment	Response
			<p>Most remaining fence posts and utility poles will be listed in Table 1 and shown on Figure 4. All fence posts and utility poles in place on September 19, 2003 forward, except those in Preble's Meadow Jumping Mouse (PMJM) habitat areas, will have been removed. In the PMJM areas, posts and poles will have been cut off to as close to ground level as possible. Posts and poles previously cut (prior to September 19, 2003) at ground level will remain and will not be discussed in Table 1 or shown on Figure 4. If a post or pole broke at or below ground surface while it was being pulled, the remaining section will be left and will not be discussed in Table 1 or shown on Figure 4.</p>
3	CDPHE	<p>Section 4.1, page 6: The last sentence is unclear and needs revision.</p>	<p>The last sentence in section 4.1 will be revised as follows: Because of the wide extent of unconsolidated surficial materials beneath the IA and eastern BZ OUs, and relatively high hydraulic conductivity compared to that of the underlying weathered claystone, the unconsolidated portion of the UHSU is the primary has the greatest influence on groundwater flow and contaminant transport at the site.</p>
4	CDPHE	<p>Section 4.2.1, page 7: Although this section may be discussing the "results from historic investigations", the current configuration of the IA should be recognized. This includes the excavations that have occurred to put in the buildings and utilities, which have increased the thickness of the unconsolidated surficial deposits, including the alluvium in the eastern thinner part of the IA. As such, the thinner areas of the alluvium, which is described as less than 10 feet, has been increased to as much as 20 feet or more of alluvium, and the alluvium has been modified to include a lot of gravel. This also removes a lot of the weathered bedrock and replaces it with</p>	<p>A new subsection (4.2.6), Artificial Fill, will be added to the text. Section 4.2.6 will be as follows: Artificial fill is a term that applies to material that has been deposited through human activities rather than geologic processes. Included as artificial fill are earthen dams and berms, railroad embankments, roads, landfills, and backfill related to RFETS development or closure, as well as the mine dumps associated</p>

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		alluvium. Therefore, the groundwater would now preferentially flow through the alluvium, rather than the weathered bedrock as stated. The last sentence is not part of the description of the RFA lithology.	<p>with quarry operations on the west side of the site (see Figure 7). Many deposits of artificial fill are merely composed of reworked RFA, weathered claystone, and/or other original materials, which have been displaced from their original position and redistributed. Other deposits are not of a geologic origin, such as sanitary wastes in landfills and concrete rubble in basements. Deposits of artificial fill at RFETS are most commonly less than 10 feet thick, though they may exceed 30 feet thick (e.g., dams, landfills) (EG&G, 1995a)."</p> <p>The last sentence in section 4.2.1: "In a few locations, the pediment surface beneath the RFA has been eroded, exposing the Arapahoe Formation and/or the Laramie Formation" will be deleted.</p>
5	CDPHE	Section 4.2.2, page 7: Revise second sentence: "...and has a hydraulic conductivity intermediate to the hydraulic conductivities of those two formations." Colluvium is a mass wasting deposit that includes landslides and slumps, Section 4.2.3 should actually be a subsection of this section.	<p>The second sentence in section 4.2.2 will be revised as follows:</p> <p>This material is derived from the RFA and underlying weathered bedrock, and has a hydraulic conductivity that ranges between the hydraulic conductivities of the RFA and weathered bedrock and has a hydraulic conductivity intermediate to the hydraulic conductivities of those two formations.</p> <p>Section 4.2.3 will be revised to become a subsection of section 4.2.2.</p>
6	CDPHE	Section 4.2.5, page 8: The caliche, as discussed, has been almost entirely destroyed and rarely remains in the IA area due to the intense reworking of the alluvium and shallow bedrock. This should also be discussed.	The following sentence will be added to the end of original section 4.2.5: Activities related to construction and site development has removed caliche deposits from some areas, particularly within the IA.
7	CDPHE	Section 4.3.2, page 10: Describe the Laramie sandstones in more detail - how	Section 4.3.2 will be revised as follows: The

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		are they different from the Arapahoe? Are they connected enough to provide a pathway for ground water? Add a section describing the Laramie-Fox Hills Formation and disconnection to surficial flow system.	<p>upper contact of the Laramie Formation generally occurs at a depth of approximately 100 feet below the RFETS ground surface, but in the IA OU and east BZ OU, where the RFA is thinner and the Arapahoe Formation is thin or absent, the depth to the Laramie Formation is much less. However, in locations where the RFA is thin and the Arapahoe Formation is absent, the depth to the Laramie Formation is much less. The Laramie Formation is informally divided into two intervals: (1) an upper claystone unit, and (2) a lower unit composed of sandstone, siltstone, and claystone with coal layers (Weimer 1973). The upper unit is estimated to be approximately 460 feet thick at some locations at the site and consists of light- to medium-gray kaolinitic claystones with few, dark-gray to black carbonaceous claystones approximately 300 to 500 feet thick and consists primarily of olive-gray and yellowish-orange kaolinitic claystones, with lesser amounts of dark-gray to black carbonaceous claystones, discontinuous coal beds, and lenticular sandstone deposits (EG&G, 1995a). These sandstone beds are less mature than those of the Arapahoe Formation, being finer-grained and including more silt, clay, and carbonaceous material. Because they are discontinuous and contained within relatively tight, low-permeability claystones, these sandstone lenses do not appear to represent a viable pathway for groundwater, and the upper Laramie Formation is considered a confining unit (EG&G, 1995b). The lower unit, estimated to be approximately 285 feet thick, consists of coal beds and sandstones</p>

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			<p>(Weimer 1973). The lower unit of the Laramie Formation is approximately 300 feet thick and consists of kaolinitic claystones, sandstones, and coal beds (EG&G, 1995a).</p> <p>Please note that “the Laramie-Fox Hills Formation” does not exist as a geologic unit, but as a hydrogeologic unit. A brief summary of the Fox Hills Sandstone will be added as a new section 4.3.3 as follows:</p> <p>4.3.3 Fox Hills Sandstone The Fox Hills Sandstone is 90 to 140 feet thick at RFETS and consists of well-sorted, quartz-rich sandstones (EG&G, 1995a).</p> <p>The following paragraph will be added at the end of Section 6.1 as follows: Sandstone beds of the lower Laramie Formation and the underlying Fox Hills Sandstone are grouped together as the regionally-important Laramie/Fox Hills aquifer. This aquifer is separated from the UHSU by the approximately 800-900 feet-thick LHSU confining layer (DOE 2005, Groundwater IM/IRA, Appendix A; EG&G 1995b).</p>
8	CDPHE	<p>Section 4.4, page 11: Add the standard cross section figure to this discussion. Replace second paragraph with an explanation of the upturned beds on the western side of the site and describe the hydrogeologic impact.</p>	<p>Figure 1-4 from the RFCA 2002 Groundwater Annual Report (February 2004) will be added to the final draft RI/FS report.</p> <p>The second paragraph will be moved to section 4.5 as requested in CDPHE comment 9.</p> <p>The following sentences will be added at the end of the section: Earlier studies at RFETS (e.g., EG&G, 1995b)</p>

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			suggested outcrops of the upturned beds on the western side of the site act as a primary source of recharge to the UHSU groundwater at the site. Modeling results and the Site Wide Water Balance study indicate direct recharge within the IA may be more important than previously estimated (KH, 2002a).
9	CDPHE	Section 4.5, page 11: The tectonics paragraph from the previous section fits better here. Replace “Verdos Alluvium” with “other recent deposits” and start new sentence with “Evaluation”. Qualify seismic risk discussion with further evaluation that the Colorado Geologic Survey is requesting of the USGS. Please provide additional information about other faults referenced in last sentence, are they the same as those discussed elsewhere in this document?	<p>The original second paragraph in section 4.4 will be moved to section 4.5.</p> <p>“Verdos Alluvium” will be replaced with “other recent deposits”. The following sentence will start with “Evaluation”.</p> <p>No change was made to qualify seismic risk discussion with further evaluation requested by Colorado Geologic Survey. The final draft RI/FS Report is presenting information as it is currently known. Once the USGS provides additional information, the section could be updated.</p> <p>The following paragraph will be removed: Other faults have been inferred at the site, but not extensively characterized, based on lineaments and other structures found during drilling and excavation. These features are also confined to bedrock formations and do not appear to be active.</p>
10	CDPHE	Section 4.6, page 12: Add specific discussion of the effect of these geomorphic processes on the site ponds and the OLF cover. Page 13 – Table 2 lists the names of the 6 soil types, please include these names in these group descriptions.	<p>The following two paragraphs will be added to the end of section 4.6:</p> <p>Geomorphic processes such as those that result from erosion of embankments and collection of sediments in the ponds are expected to be very slow. Areas of the site are being graded and revegetated as necessary to account for removal</p>

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			<p>of man made features, taking erosion processes into consideration. The effects of geomorphic processes are expected to be minimal between the periodic site evaluations that may be required in the future.</p> <p>The OLF cover is an engineered soil cover with surface drainage controls and a toe buttress that greatly enhance the stability of the OLF. Due to these enhancements, the geomorphic processes described in this section will be minimized at the OLF as compared to adjacent areas.</p> <p>The following language will be inserted into the bullets in section 4.7: In the “Pediment” bullet: (flat upland area; predominantly Flatirons soil series) In the “Valley slope soils” bullet: (for example, Nederland, Denver-Kutch-Midway soils) In the “Hilltop soils” of the eastern third of RFETS bullet (including the Flatirons soil series) In the “Drainage-bottom soils bullet (for example, Haverson soils)</p>
11	CDPHE	<p>Section 5.0, page 14: Last paragraph typo- 0 should be 5.4. The period of record used for all the surface water discussions should include earlier data, starting with October 1996 eliminates one of the most significant surface water events onsite. If the data is not available it should be acknowledged that flood flows have exceeded the measurement ability of the flow gages.</p>	<p>The sentence will be revised to correct the typo. Please note that all the section numbers will change once the Summary Report is converted into Section 2 of the final draft RI/FS Report.</p> <p>The report uses flow data starting in October 1996 because the date corresponds with the beginning of RFCA monitoring, and the data quality controls associated with that monitoring. It is acknowledged that flood</p>

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			flows exceeded the capacity of flumes for flow monitoring (during the May 7, 1995 event as well as at other times) because of difficulties associated with sizing a flume to accurately measure minor flows (less than 0.1 cfs) as well as large storm-driven flows (e.g., estimated over 70 cfs at GS01) at the same gage location.
12	CDPHE	Section 5.2.6, page 21: The Water Supply Classification is still in place Great Western Reservoir, future use as a drinking water supply is not precluded.	Future use of Great Western Reservoir as a drinking water supply is precluded by the terms of the Option B grant from DOE to the City of Broomfield.
13	CDPHE	Section 6.0 page 27: Differentiate the Laramie-Fox Hills Aquifer from the LHSU, describe the LFH in the Regional Setting section for completeness.	Please see response to CDPHE Comment 7. The following sentence will be added to the end of section 6.1: The LHSU acts as a confining layer to separate the UHSU from the Laramie/Fox Hills Aquifer, which constitutes a regional water supply resource.
14	CDPHE	Section 6.2, page 29: In documents written for the public in the US it is helpful to include a translation to units commonly used such as feet/day for hydraulic conductivity.	The following will be added to the bullets in section 6.2: Converting to ft/yr and rounding to the nearest 10 ft (except for weathered claystone): RFA: 430 ft/yr VFA: 950 ft/yr Colluvium. 100 ft/yr Kass#1: 820 ft/yr WCI: 1 ft/yr The following conversion will be added to the last paragraph of section 6.1 after the range of LHSU conductivities: (about 3 inches/year to 0.003 inches/year).
15	CDPHE	Section 6.3.1, page 30: Although the general discussion may be historically correct, there should be added discussion recognizing the changes that have occurred in the bedrock surface and resulting modifications to groundwater flow, as described in the 2003 studies, as presented. These changes include	The following new paragraph be added at the end of section 6.3.1: The bedrock surface has been modified in some areas of the RFETS IA due to incised utility

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		<p>the potential increase in groundwater levels that are expected to occur (up to 3 ft increase) now that most of the ground cover has been removed (some slabs remain below 3 feet), the increase in alluvium due to previous infrastructure excavations, and the related lowering of the bedrock levels in the eastern IA, as well as channeling into the bedrock for utilities, storm drains, and sanitary sewer lines. These changes to the UHSU throughout the IA will modify the potentiometric surface and groundwater flow as well as potential changes to seep discharges. It might also be advantageous to include a figure describing the groundwater modeling to identify potential future groundwater levels and movement based on the changes that have occurred.</p>	<p>corridors and excavations for building basements and other structures. These modifications locally affect the occurrence, distribution, and flowpath of groundwater. The potentiometric surface shown in Figures 12 and 13, and published in previous reports, reflects these modifications. However, impermeable surfaces (parking lots, roads, etc.), will be removed, which may result in an increase in the infiltration in many areas. Accelerated actions or land configuration activities are also adding backfill where buildings were previously located, disrupting subsurface flowpaths and removing the water supply system that previously was a source of groundwater recharge due to leakage from the system subsurface distribution piping. The cumulative impact of these changes on groundwater occurrence and distribution will be evaluated through the integrated monitoring program that will be implemented after the accelerated actions are complete. It is unlikely that the cumulative impacts will be realized prior to the implementation of the final remedy pursuant to the CAD/ROD. It may take many years before changes result in a new “steady state” groundwater level and flow condition. The evaluation of groundwater occurrence and distribution data will be included in future periodic reviews, as appropriate.</p>
16	CDPHE	<p>Table 1, page 69: Please include plugged drain lines, process waste lines, and sewers in table revision. Needs to be expanded as indicated, to include other remaining infrastructures, as well as changes to the list provided. B991, 881, and 771 include Tunnels (some filled, some empty). B707 slab has been completely removed, and B444 is supposed to be also. This table should also be modified to identify if the remaining infrastructure is contaminated or not.</p>	<p>Please see the response to CDPHE comment 2.</p>

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17	CDPHE	Table 4, page 72: Should also include the activities that have occurred, such as the removal of contaminated sediment from the B ponds. Also include modifications due to dam notching.	Please see the response to the CDPHE general comment.
18	CDPHE	Table 5, page 75: Does the dash in the discharge volume columns mean no estimate or zero?	The dash in the discharge volume columns mean no estimate; however, the table will be updated in the final draft RI/FS Report to incorporate updated model-predicted discharges.
19	CDPHE	Table 10, page 81: Segment 10, believed to be occupied by a gas pipeline. This gas pipeline has been in the way of every project on the south facing slope of Woman Creek, either the site knows of it's existence and location or it doesn't. This is a very bad place to lack information on a gas pipeline. Please resolve this lack of information.	Table 10 is the list of private easement and license holders. Its purpose is to identify third parties that may have an interest in land at the site as well as alert the reader to the presence of utilities that may not otherwise be apparent. Table 10 indicates that no easement documentation was recorded in the county records for the line marked as reference number 10, and that, to DOE's knowledge, no such easement agreement is available in federal records. It should not be inferred from the table that DOE does not know the location or existence of the gas line.
20	CDPHE	Figure 4, page 89: Please include the additional information requested for Table 1 in this revised figure, identify the contaminated structures remaining, as well as areas.	Please see the response to the CDPHE general comment.
21	CDPHE	Figure 6: As has been pointed out numerous times, this map does not provide an accurate determination of actual landslide and high erosion areas associated with the IA or to the NW or the IA (in the Walnut Creek drainage). It should, therefore, be properly modified to provide the appropriate data, rather than continue to provide inaccurate information. Two of the subsurface treatment systems are in landslide-prone areas. This fact needs to be considered in the RI/FS to evaluate the treatment system stability.	Figure 6 is consistent with RFCA Attachment 5, Figure 1, Areas of Landslides and High Erosion. The original figure was created by transferring data directly from the USGS Shroba map of Surficial Geology.
22	CDPHE	Figure 17: Some labels are overprinted and it is difficult to connect other labels with the correct tract boundary, please improve this figure.	The figure will be improved to eliminate/reduce overprinting and make it easier to read for the final draft RI/FS Report.

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23	CDPHE	Figure 18: Why doesn't this figure (as well as the following figures) include the proposed vegetation to be established in and around the IA and in the drainages?	Please see the response to the CDPHE general comment.
24	CDPHE	Additional figures are needed: Why isn't the proposed land reconfiguration presented? None of the figures provide the proposed reconfiguration of the drainages within the IA. Why not include a figure identifying all known remaining subsurface contamination areas (with contamination above WRW levels). Why isn't a figure provided that identifies the area to be retained by DOE?	Please see the response to the EPA general comment. Please see the response to CDPHE comment 1.

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